REMARKS

In reply to the Office Action of March 9, 2005, Applicant submits the following remarks.

Claims 1-3 are pending, with each claim being independent.

Claims 1-3 stand rejected as allegedly being obvious over U.S. Patent No. 6,049,565 ("Paradine") in view of J.S. Erkelens and P.M.T. Broersen, "Bias Propagation in the Autocorrelation Method of Linear Prediction," IEEE Trans on Speech and Audio, Vol. 5, pp. 116-116, 1997 ("Erkelens"). Applicant requests withdrawal of this rejection because neither Paradine nor Erkelens, alone or in combination, describes or suggests the subject matter of independent claims 1, 2, or 3.

As explained in the application (e.g., at page 9), when a person (particularly a novice computer user) attempts to use Internet telephony and real-time streaming applications, it can be difficult for the person, or for a remotely located help-desk worker, to determine whether or not the microphone used by the user is connected to the real-time communication system. It is therefore desirable to determine automatically whether or not the microphone is properly connected, to reduce (or eliminate) the amount of time otherwise required by the user and/or a help-desk worker in troubleshooting the problem.

Independent claims 1, 2, and 3, respectively, recite a method, a computer program, and a computer system for detecting whether or not a microphone is connected to a real-time audio communication system of a computer. As recited in the claims, an audio sample is recorded through the real-time audio communication system, a DC component is filtered out of the audio sample, and values of auto-correlation coefficients of the filtered audio sample are determined. The values of the auto-correlation coefficients of the filtered audio sample are compared with predetermined values. Whether a microphone is properly electrically connected to the real-time audio communication system and whether the microphone is not properly electrically connected is determined based on the comparison of the values of the auto-correlation function coefficients with the predetermined values.

The Office action asserts that:

> Paradine teaches the suspension of transmission between the microphone and the device it is communicating with when a predetermined valued is reached (column 6, lines 27-43; column 7, lines 1-23). In the cited portions, Paradine teaches values determined by sampling to detect activity or the absence of activity. Paradine teaches the termination if there is no activity. Therefore it would be obvious to one of ordinary skill in the art at the time the invention was made that if the microphone connection is terminated, microphone connection termination will be assumed.

Office action at page 2.

Because the Office's characterization of Paradine is not rigorous and does not relate particular sentences or disclosure in Paradine to the language of the pending claims, it is useful to examine Paradine's disclosure closely and in the proper context. Paradine's abstract states that the disclosure relates to an

> [a]udio communication apparatus which facilitates reduction of data network traffic. The communication apparatus distinguishes between voice activity and silence or background noise. Upon termination of voice activity the apparatus output the contents of it memory thus far for transmission over the data network. When voice activity is resumed after a period of inactivity, the transmission of voice data is resumed and an indication of the elapsed time between the previous voice samples and the current samples is also transmitted to a receiving terminal to allow correct timing of the output of the resumed transmission of the voice samples.

Paradine's disclosure explains that a

> DSP [digital signal processor] also monitors the samples to determine whether or not they represent voice activity at the microphone 305.... Alternatively, a simple threshold value can be used to determine whether or not samples represent speech i.e. if the sample value is above the threshold voice activity is present and visa versa. If the current sample does not represent voice activity, an interrupt to the microprocessor 205 is raised indicating that the voice samples stored thus far should be immediately transmitted over the data network 110 to the intended addressee. Such an immediate transfer of the samples results in a variable length block of voice samples.
>
> The DSP 215, upon determining that voice activity is not present, no longer stores samples, which now represent either silence or very low level back-ground office noise. Since the samples do not represent voice activity the DSP ceases to interrupt the microprocessor and transmission of data over the data network 110 is

suspended. Accordingly, the traffic over the data network 110 is reduced. As only approximately forty percent of the data emanating from a conventional terminal represents voice activity, the present invention achieves approximately a sixty-percent reduction in traffic associated with an audio communication.

During the period of suspension, the DSP continues to monitor the samples output by the codec. The storage and subsequent transmission of samples over the data network is resumed when voice activity is detected.

Although, transmission over the data network is suspended the DSP 215 continues to maintain the sample count. In an embodiment, an overflow count is maintained of the number of times the samples count as overflowed and reset to zero. When the overflow count reaches a predetermined value, an interrupt is raised to the microprocessor 205 requesting transmission of the sample count over the data network. Such a transmission is effected in the usual manner. Periodically transmitting the sample count as described has a two fold advantage. Firstly, the transmission prevents the data network from timing out and dropping the connection between an addressor and an addressee. Secondly, the receiving apparatus can use the sample count to maintain the correct timing of the output of any subsequently received samples representing voice activity when transmission resumes. Transmission continues after resumption as described above.

At step 505 the signal output from the microphone is sampled and the sample count is incremented by one. A determination is made as to whether or not a microphone is picking up voice activity at step 510. If the microphone is picking up voice activity, the sample is added to the memory 325 and the length count is incremented by one at step 515. After the sample is added to memory 325, a check is made, at step 520, as to whether or not the samples should be output for transmission over the data network by comparing the length count against a predeterminable threshold. The threshold value is dependent upon the maximum size of the buffer or an acceptable transmission delay which will not affect the intelligibility of the speech as discussed above. If there are sufficient samples, all samples stored in the memory 325 are output to the token ring card for transmission over the data network at step 525. At step 530 the length count is reset to zero then sampling of the microphone signal is resumed at step 505. If the microphone is not picking up voice activity, a determination is made at step 535 as to whether or not the memory 325 contains any samples to be output for transmission by the token ring over the data network. If the length count is equal to zero the memory 325 does not contain any such samples and sampling of the microphone signal is resumed. If the length count is not equal to zero, the memory 325 contains samples which should be immediately output for transmission over the network. Any such samples are so output for transmission at step 525. The length count is then reset to zero at step 530 and sampling of the microphone is resumed at step 505.

Paradine, column 6, line 7 to column 7, line 23 (emphasis added).

Clearly, Paradine is concerned not with "detecting whether or not a microphone is connected to a real-time audio communication system of a computer," as recited in independent claims 1, 2, and 3. Rather, Paradine is concerned with distinguishing between voice activity and noise or silence picked up by a microphone that is always connected to the DSP. The point of Paradine's disclosure is that bandwidth is wasted when it is used to transmit noise or silence. To solve this problem, Paradine discloses monitoring a signal received from a microphone and distinguishing voice data from noise and silence in the received signal. The voice activity data is transmitted as it occurs, but the transmission is suspended when noise or silence is detected. When voice activity is detected again, it is transmitted along with a signal indicating the time between the current and previous voice activity data.

Thus, throughout Paradine's process, the microphone always remains electrically connected to the DSP, further illustrating that Paradine is not concerned with detecting whether or not the microphone is connected but with discriminating voice data and noise picked up by the properly connected microphone. When Paradine suspends transmission of voice data over the network, the "DSP continues to monitor the samples output by the codec (i.e., from the microphone)." Column 6, line 37-39. As shown in FIG. 3 and described at column 4, lines 36-48 of Paradine, the codec is connected to the microphone 305 through an analog-to-digital converter 300, and the codec passes digitized audio samples to the DSP 315. Thus, the microphone is always connected to the audio communications system in Paradine.

In consideration of the above, the Office's assertion that "Paradine teaches the termination of the connection if there is no activity" is incorrect for at least two reasons. First, the Office is wrong to equate a connection between the DSP and the network in Paradine with the connection between the microphone and the communication system in the pending claims. Second, in Paradine, not even the connection between the DSP and the network is terminated when transmission of noise or silence is suspended. Indeed, Paradine stresses that even while transmission of noise and/or silence is suspended, a sample count is transmitted periodically to "prevent[] the data network from timing out and dropping the connection between an addressor and an addressee." See column 6, lines 51-53. For at least these reasons, the Office's

characterization of Paradine's disclosure is incorrect, and Paradine's disclosure cannot support the Office's obviousness assertion.

Furthermore, claim 1 requires determining whether a microphone is properly connected to the real-time audio communication system based on the comparison of the values of the auto-correlation function coefficients with the predetermined values and determining whether a microphone is not properly connected to the real-time audio communication system based on the comparison of the values of the auto-correlation function coefficients with the predetermined values. Paradine simply fails to disclose or suggest the subject matter of claim 1. Paradine's disclosure of distinguishing voice data received from a microphone from noise or silence received from the microphone has nothing to do with determining whether or not the microphone is properly connected to a audio communication system. The Office action fails to explain any connection between distinction between voice activity data and noise disclosed in Paradine and the claimed detection of whether or not a microphone is properly connected. Thus, the Office has failed to establish a prima facie case of obviousness.

Finally, the Office's statement that "it would be obvious to one of ordinary skill in the art at the time the invention was made that if the microphone connection is terminated, microphone connection termination will be assumed" is not helpful. The statement is a truism. As such, the statement does not contribute an explanation of what connection, if any, the Office sees between the disclosure of Paradine and the subject matter of the pending claims.

Thus, because Paradine does not disclose what the Office claims Paradine teaches and because the Office has failed to establish a connection between Paradine's disclosure and the pending claims, the pending claims are not obvious in view of Pardine.

Erkelens relates to a particular autocorrelation method. However, Erkelens does not disclose or suggest using the method to determine whether a microphone is properly connected to an audio communication system.

For at least these reasons, applicants request withdrawal of the rejection of independent claim 1. Applicants also request withdrawal of the rejection of independent claim 2, which recites a computer program for detecting whether a microphone is connected to an audio communications system of a computer, and independent claim 3, which recites a computer

system running programmed processes comprising a process for detecting whether a microphone is connected to an audio communication system.

No fees are believed to be due at this time. Please apply any other charges or credits to deposit account 06-1050, referencing Attorney Docket No 06975-208001.

Respectfully submitted,

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